What is claimed is:

1. A method of utilizing at least one π-conjugated polymer (CP) for the detection of one or more analytes through the inner filter effect, the method comprising:
  - mixing the at least one π-conjugated polymer with an analyte in a solution;
  - applying electromagnetic radiation to the solution, wherein the radiation or fluorescence of the π-conjugated polymer is altered or attenuated by the analyte;
  - measuring the attenuated radiation or fluorescence from the polymer to obtain fluorescence data; and
  - processing and analyzing by at least one algorithm the attenuated radiation or fluorescence data to detect the presence and/or the type of the analyte.

2. The method of claim 1, wherein the π-conjugated polymer is comprised of monomers that consist of single or multiple arenes, heteroarenes, unsaturated linkers, or a combination thereof.

3. The method of claim 1, wherein the π-conjugated polymer is a homopolymer.

4. The method of claim 1, wherein the π-conjugated polymer is a copolymer.

5. The method of claim 1, wherein the π-conjugated polymer varies in size or molecular weight with at least one other utilized π-conjugated polymer.

6. The method of claim 1, wherein the conjugated polymer is immobilized and incorporated in a solid state material for detection of the analyte(s).

7. The method of claim 6, wherein the solid state material is a membrane, film, polymer resin, filter paper, coating, or inorganic or organic mixture.

8. The method of claim 6, wherein single or multiple analytes are discriminated utilizing at least one multivariate pattern recognition algorithm.

9. The method of claim 1, wherein the solution is static.

10. The method of claim 1, wherein the solution is dynamic and flows.

11. A method of utilizing at least one π-conjugated polymer (CP) for the detection of one or more analytes through the inner filter effect, the method comprising:
  - placing the at least one π-conjugated polymer in a first solution and placing an analyte in a second solution, wherein the polymer does not mix with or touch the analyte and wherein the first solution is static and the second solution is dynamic, or vice versa, or, alternatively, both solutions are static or both solutions are dynamic;
  - applying electromagnetic radiation to both first and second solutions, wherein the radiation or fluorescence of the π-conjugated polymer is altered or attenuated by the analyte;
  - measuring the attenuated radiation or fluorescence from the polymer to obtain fluorescence data; and
  - processing and analyzing by at least one algorithm the attenuated radiation or fluorescence data to detect the presence and/or the type of the analyte.

12. The method of claim 11, wherein the first solution consists of or is made of a different solvent than the second solution or, alternatively, the first solution and the second solution consist of or are made of the same solvent.

13. The method of claim 6, wherein the conjugated polymer is mixed with or immobilized in a matrix of any organic polymer or inorganic material.

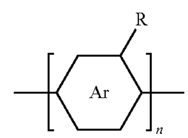
14. The method of claim 6, wherein the analyte is layered above, below, or on any side of the conjugated polymer in the solid state material.

15. The method of claim 1, wherein the analyte is immobilized and incorporated in a solid state material comprised of a membrane, film, polymer resin, filter paper, coating, or inorganic or organic mixture for detection of the analyte(s).

16. The method of claim 8, wherein the measured attenuated radiation or fluorescence from the polymer is processed and/or analyzed by an algorithm that comprises at least one machine learning algorithm and wherein the algorithm is processed by a microprocessor-based device.

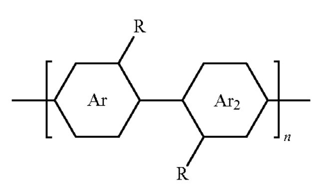
17. The method of claim 8, wherein the discrimination of multiple analytes is visualized by an algorithm that comprises at least one machine learning algorithm.

18. The method of claim 1, wherein the π-conjugated polymer has the formula:



where Ar is an arene or (hetero)arene; R is selected from the group consisting of: variable length, linear or branched, aliphatic ethylene glycol chains or halogen-containing or heteroatom-containing chains of length n, where n is an integer value, unsubstituted hydrocarbyl, substituted hydrocarbyl, unsubstituted aryl, substituted aryl, unsubstituted heteroaryl, substituted heteroaryl, unsubstituted hydrocarbylene, hydrocarbyl, and substituted hydrocarbylene, hydrocarbyl, R^2F, R^2Cl, R^2Br, R^2I, R^2CN, —R^2, —R^2OH, —R^2OR^3, —R^2COOH, —R^2COOR^3, —R^2NH_2, —R^2NHR^3, $R^2NR^3R^4$, —$R^2SO_3^-$, —$R^2NH_3^+$, or —R^2COO^-, and other charged functionalities, where R^2, R^3, and R^4 are independently selected from a hydrocarbyl group or an ethylene glycol-based group; R can be any functional group; and n is an integer between about 10 and about 1000.

19. The method of claim 4, wherein the copolymer has the formula:



where Ar and Ar_2 are arenes or (hetero)arenes and where Ar and Ar_2 are different in identity; R is selected from the group consisting of: variable length, linear or branched, aliphatic ethylene glycol chains or halogen-containing or heteroatom-containing chains of length n, where n is an integer value, unsubstituted hydrocarbyl, substituted hydrocarbyl, unsubstituted aryl, substituted aryl, unsubstituted heteroaryl, substituted heteroaryl, unsubstituted hydrocarbylene, hydrocarbyl, and substituted hydrocarbylene, hydrocarbyl, R^2F, R^2Cl, R^2Br, R^2I, R^2CN, —R^2, —R^2OH, —R^2OR^3, —R^2COOH, —R^2COOR^3, —R^2NH_2, —R^2NHR^3, $R^2NR^3R^4$, —$R^2SO_3^-$, —$R^2NH_3^+$, or —R^2COO^-, and other